AE 321 HW6

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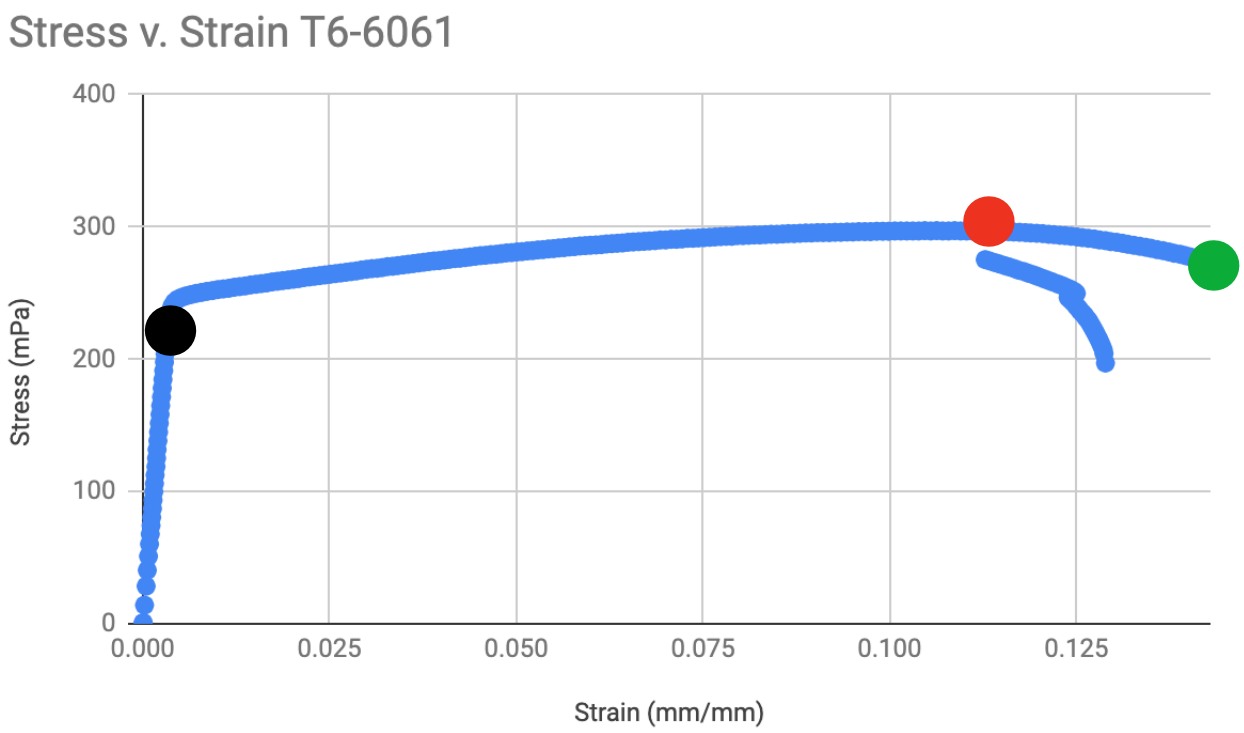
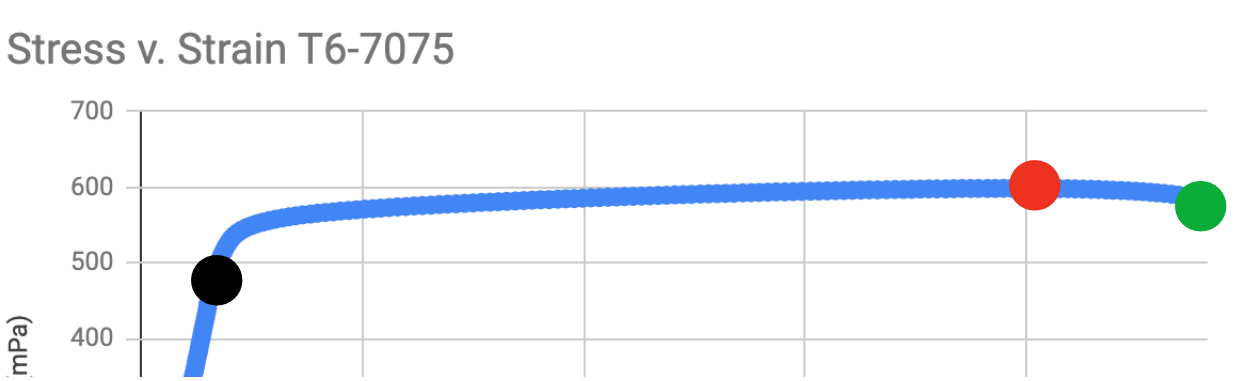
Friday, October 22, 2021 6:19 PM



(0.0004574, 28.4357) (0.002122, 144.899) (strain, stress)

E = (144.899 - 28.4357) / (0.002122- 0.0004574) = 69,964.736273 MPa / (mm/mm)



(asrigo2)

oint

of necking

e Point

Estimated Stress/Strain Values from Graph

Proportional limit: 0.003921 (mm/mm)
240.1299 (MPa)

0.2% offset stress: 0.003921 + 0.002 = 0.005921 (mm/mm)
248.345 (MPa)

UTS: 297.203 MPa

Failure Strain: 0.1289 mm/mm

In order to calculate the Elastic Modulus, I used two points that were well below my proportional limit to calculate the slope, since that is within the elastic region.

Elastic Strain = 0.03 - 270.54/69964.73 = 0.0261 (mm/mm)

0.0261 + 0.002 = 0.0281 (0.2% offset)

NYS = 266.53 MPa

oint

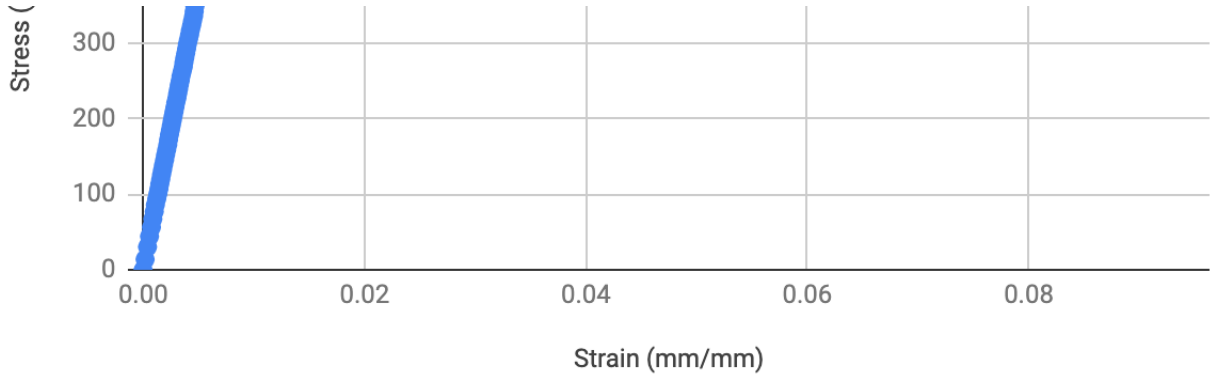
of necking

e Point

Proportional limit: 0.007655 (mm/mm)
521.29 (MPa)

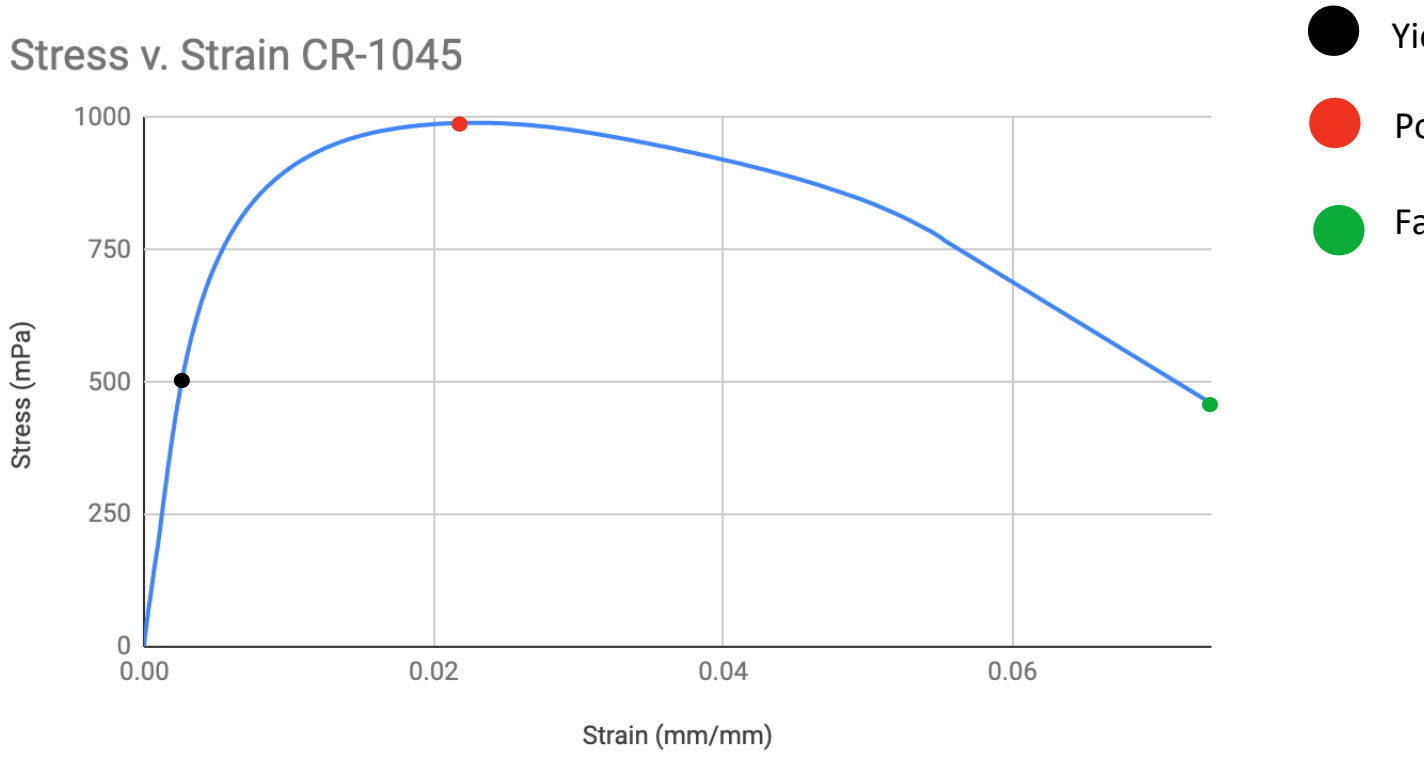
0.2% offset stress: 0.007655 +0.002 = 0.009655 (mm/mm)
545.67 (MPa)

UTS: 598.606 MPa



(0.0007509, 56.270033) (0.004462, 329.181) (strain, stress)

E = (329.181 - 56.270033) / (0.004462-0.0007509) = 73,539.1035003 MPa/ (mm/mm)



(0.0005434, 117.851) (0.002126, 428.904).

Failure Strain: 0.0837 mm/mm

In order to calculate the Elastic Modulus, I used two points that were well below my proportional limit to calculate the slope, since that is within the elastic region.

Plastic Strain = 0.03 - 536.23/73539.103 = 0.0227 (mm/mm)

0.0227 +0.002 = 0.0247 (0.2% offset)

NYS = 575.28 MPa

eld Point

oint of necking

ailure Point

Proportional limit: 0.003867 (mm/mm)
644.089 (MPa)

0.2% offset stress: 0.003867 +0.002 = 0.005867 (mm/mm)
773.78 (MPa)

UTS: 990.193 MPa

Failure Strain: 0.07374 mm/mm

Plastic Strain = 0.03 - 981.37/196545.558 = 0.025 (mm/mm)

0.025 + 0.002 = 0.027 (0.2% offset)

NYS = 984.82 MPa

In order to calculate the Elastic Modulus, I used two points that were well below my proportional limit to calculate the slope, since that is within the elastic region.

E = (428.904 - 117.851) / (0.002126- 0.0005434) = 196,545.5579426 MPa / (mm/mm

F) For my 7075-T6 had a higher Ultimate Tensile Stress than the 6061-T6 Aluminum (5
6061-T6 also had a more dramatic necking change than the 7075-T6. Furthermore,
more dramatic stress change from yield point to the Ultimate Stress Point than both
Aluminum samples. However, T6-7075 had a larger difference than the T6-6061 sam

m)

98.6 > 297.2).
CR-1045 had a
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